

CHAPTER I

INTRODUCTION

Nowadays, seafood industry has produced large quantities of shell waste causing diverse environmental problems. The waste from crustaceans exoskeleton of shrimps and crabs consists of chitin and chitosan which are natural polymer having excellent biocompatibility, biodegradability and low toxicity (Jayakumar *et al.*, 2011) . due to, highly sophisticated functions, there are many biomedical applications that have used chitin and chitosan as bioactive raw material.

Chitin is a natural hetero-polysaccharides, linear polysaccharide consists of 2-acetamido 2-deoxy-b-D-glucose through a β -(1,4) linkage. (Einbu *et al.*, 2008) It is also known to be one of natural hetero-polysaccharides with many utilizations such as wound dressing, drug delivery and scaffold in tissue engineering. (Jayakumar *et al.*, 2011) However, chitin has limited in the chemical reactivity due to its high crystalline structure.(Tamura *et al.*, 2011) . There are many studies of chemical modification of chitin. chitin hydrogel, a highly reactive form of chitin with low crystalline structure, was prepared by dissolving chitin in calcium chloride dihydrate-saturated methanol, followed by precipitation in distilled water and the amorphous form of chitin was performed.

Chitosan is the derivative of chitin which obtained from deacetylation reaction under strong alkaline solution and heat. It has been demonstrated by a number of researchers that chitosan has a great potential for a wide range of uses due to its biodegradability, biocompatibility, non toxicity and versatile chemical, physical properties.(Tolaimate *et al.*, 2003) Chitosan

Solution Plasma Process (SPP) is a liquid-phase plasma system which has been applied in several applications such as synthesis of metal nano-particles ,water treatment, sterilization, depolymerization of biopolymer and decomposition of organic compounds. (Takai, 2008) SPP generated many reactive species such as hydroxyl radical, hydroperoxy radical, free electron, superoxide anion which stimulated the chemical reactions (Prasertsung *et al.*, 2012).

In these research, solution plasma technique has been used to deacetylated and depolymerized chitin hydrogel to form chitosan in order to reduce the high alkali concentration .reduce molecular weight of chitin and chitosan and improve the properties of chitin and chitosan such as solubility , degree of deacetylation and crystallinity.